

REMARKS

Claims 1 to 3 are pending in the present application. Applicants respectfully submit that claims 1 to 3 are patentable for at least the reasons provided below and request reconsideration of the application.

Applicants thank the Examiner for acknowledging the claim for foreign priority and the receipt of all certified copies of the priority documents.

Applicants thank the Examiner for acknowledging the receipt of an Information Disclosure Statement, PTO 1449 and references cited therein.

I. INTERPRETATION OF CLAIM 1

The Office Action states the following:

“The Examiner interprets the claims as being directed to a zirconium alloy comprising by weight: (I) 200 to 700 ppm of iron and (II) at least one of the elements selected from the group consisting of: (a) chromium and vanadium, (b) 0.8% to 1.3% niobium, (c) 1100 to 1700 ppm of oxygen, (d) less than 100 ppm of carbon, (e) 10 to 35 ppm of sulfur and less than 50 ppm of silicon, and (f) less than 100 ppm of tin.”

Applicants respectfully traverse the above interpretation and request an alternate interpretation in keeping with the language of claim 1. Claim 1 recites a zirconium based alloy also containing, by weight, 200 to 700 ppm in total firstly of iron and secondly at least one of the elements selected from the group consisting of: chromium and vanadium, 0.8% to 1.3% by weight of niobium, 1100 to 1700 ppm of oxygen, less than 100 ppm of carbon, 10 to 35 ppm of sulfur and less than 50 ppm of silicon, and tin content 100 ppm or less in weight. Claim 1, therefore, that the value of 200 to 700 parts per million are related to the TOTAL firstly of iron and secondly at least one of the elements selected from the group consisting of: chromium and vanadium, 0.8% to 1.3% by weight of niobium, 1100 to 1700 ppm of oxygen, less than 100 ppm of carbon, 10 to 35 ppm of sulfur and less than 50 ppm of silicon, and tin content 100 ppm or less in weight. Applicants further submit that the specification on page 3, lines 23 and 24 provide support for this interpretation. Applicants respectfully submit that claim 1 is fully consistent with the requirements of 35 U.S.C. §112 and respectfully request interpretation as provided in the claim language.

Applicants furthermore submit that the specification on page 3, lines 23 and 24 provides support for this interpretation.

Applicants furthermore respectfully submit that a person of skill in the art would not interpret claim 1 such that the alloy would have 200 to 700 ppm of iron and undetermined quantities of Cr and V. It would have been illogical for the applicant to have provided precise figures for relatively minor alloying elements such as C, O, S, and Si while allowing complete uncertainties for elements such as Cr and V in the specification wherein the presence of which in zirconium alloys can be large and have fundamental influences on the alloys properties. In the interpretation provided in the Office Action, even contents of Cr and V of several weight percent would be within the scope of the claims and would obviously be incorrect in particular because the alloys would not have precipitates similar to the types required in the invention. For this additional reason, applicants respectfully request interpretation of claim 1 as provided above.

II. Rejection of Claims 1 to 3 Under 35 U.S.C. § 102(b)

Claims 1 to 3 were rejected under 35 U.S.C. § 102(b) as being anticipated by United States Patent Number 4,212,686 ("Lunde et al."). Applicants respectfully submit that Lunde et al. do not anticipate claims 1 to 3 for the following reasons.

Claim 1 recites a zirconium based alloy also containing, by weight, 200 to 700 ppm in total firstly of iron and secondly at least one of the elements selected from the group consisting of: chromium and vanadium, 0.8% to 1.3% by weight of niobium, 1100 to 1700 ppm of oxygen, less than 100 ppm of carbon, 10 to 35 ppm of sulfur and less than 50 ppm of silicon, and tin content 100 ppm or less in weight.

Lunde et al. allegedly relate to zirconium alloys. Lunde et al. provide for an alloy with 0.92 to 0.94 weight percent niobium, 0.06 and 0.09 weight percent tin, 100 ppm chromium, 45 ppm molybdenum and 0.04 weight percent iron (as provided in Alloy 2). Lunde et al. also provide for 1.10 to 1.13 weight percent niobium, 0.05 to 0.06 weight percent tin, .04 to 0.54 weight percent chromium, 40 ppm molybdenum and 0.04 to 0.05 weight percent iron (as provided in Alloy 3). Both Alloy 2 and Alloy 3, as well as the other alloys described in Lunde et al. fail to disclose or suggest the critical features of claim 1. Alloy 2, for example, provides 400 ppm of iron and 100 ppm of chromium. Alloy 2, however, **requires** a tin concentration of at least 600 ppm, much greater than the features of claim 1. Additionally, Lunde et al. always require much greater levels of tin in the specification, above 250 ppm than required

in claim 1 (under 100 ppm). Alloys 3 to 6 are similarly deficient in providing the required higher tin content levels. Lunde et al. are similarly deficient in not disclosing the presence of sulfur in the range of 10 to 35 parts per million. Lunde et al. are silent regarding this component. As a result of Lunde et al. having these multiple deficiencies, Applicants respectfully submit that the Lunde et al. reference does not anticipate claim 1 of the present invention.

Claim 3 depends from claim 1 and therefore includes all the features of amended claim 1. Applicants respectfully submit that claim 3 is patentable for at least the reasons provided above in relation to claim 1.

Claim 2 relates to a sheathing tube for a nuclear fuel rod or guide tube for a nuclear fuel assembly, made from a zirconium based alloy also containing, by weight, 200 to 700 ppm in total firstly of iron and secondly at least one of the elements selected from the group consisting of: chromium and vanadium, 0.8% to 1.3% by weight of niobium, tin content 100 ppm or less, 1100 to 1700 ppm of oxygen, less than 100 ppm of carbon, 10 to 35 ppm of sulfur and less than 50 ppm of silicon, in the re-crystallized state, at least the greater part of the iron being in the form $Zr(Nb,Fe,Cr)_2$ or $Zr(Nb,Fe,V)_2$ and in which the intermetallic compounds are of a size not exceeding 200 nm.

As provided above, Lunde et al. do not disclose or suggest the tin or sulfur levels required in claim 2. As a result of Lunde et al. failing to disclose or suggest these features, applicants respectfully request withdrawal of the rejection to claim 2.

Applicants furthermore submit that Lunde et al. describe that the functions of chromium and molybdenum and sometimes chromium, molybdenum and niobium have essential functions of the alloys considered therein.

The claims of the present invention do not have this requirement. The contents of chromium and niobium are always considered independently of one another. Moreover, molybdenum is **not** included in the claims of the present invention. The present invention, however, requires a zirconium based alloy also containing, by weight, 200 to 700 ppm in total firstly of iron and secondly at least one of the elements selected from the group consisting of: chromium and vanadium different than the Lunde et al. reference. As a result of this additional difference, applicants respectfully submit that claims 1 to 3 are patentable in view of the Lunde et al. reference.

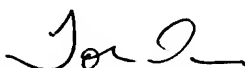
III. **Conclusion**

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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Date: 2/22/06

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